

SR 169

ROUTE DEVELOPMENT PLAN

MILEPOST 0.00 (ENUMCLAW) TO MILEPOST 22.96 (140th WAY SE)

Washington State Department of Transportation
District 1
Seattle, WA

October 1993

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EXECUTIVE SUMMARY

In the next 20 or 30 years, large areas adjacent to SR 169 could experience as many developmental changes as any location in the State. The establishment of urban growth boundaries under the Growth Management Act could modify and shape development patterns here. The impacts of this could be to alter the distribution of growth but not necessarily change the amount. The shaping of growth could result in a greater mode split and some reduction in vehicle trip demand.

For the purpose of planning, SR 169 was divided into two sections. This report covers section one, Enumclaw (MP 0.00) to 140th Way SE (MP 22.96). The second section is from 140th Way SE to the junction with I-405 in Renton. Section one is nearly 23 miles in length and will increase in importance in the future.

Because of its strategic position in Maple Valley between Renton and Enumclaw, this highway will bear a sizable portion of the transportation load. To accommodate this growth the proposal herein is for a two lane highway from Enumclaw to SR 516 with some new channelization. It is also suggested that Black Diamond, which is experiencing congestion along SR 169, assess several options for increasing capacity through the city in coordination with WSDOT. A four lane highway is proposed from SR 516 to Renton with a modest median that would provide for necessary channelization. High Occupancy Vehicle (HOV) solutions to some of the congestion problems will also be assessed for implementation in coordination with King County when levels of service in the northern portion of SR 169 drop below D.

The proposal for SR 169 was arrived at by projecting the 1992 traffic volumes at selected locations on SR 169 to year 2010, using a 3% growth rate compounded annually. Two

lanes are all that is required between Enumclaw and SR 516, with some improvements to certain intersections as well as some method of handling the congestion through Black Diamond. The level of service for this two lane segment is projected to be D by 2010. The construction of four lanes between SR 516 and Renton should result in a level of service of B for the peak direction between SR 516 and 196th Avenue SE/Jones Road. North of 196th Avenue SE/Jones Road, the level of service is expected to be D in the peak direction. All levels of service are acceptable under current growth management service level standards. Projected volumes (ADT) would range from 13,000 to 37,700 at the end of the planning period.

At this time no Route Development Plan has been written for SR 164, which accesses south King County between Auburn and Enumclaw. The Puget Sound Council of Governments (now the Puget Sound Regional Council, or PSRC) developed a document titled "SR 410 Corridor Action Plan" in 1989 for SR 410 between Sumner and Enumclaw, which is similar to a Route Development Plan and is currently in use by local jurisdictions. The recommendations in this RDP are the result of a process that considered the objectives for SR 164, SR 410 and SR 169 in a coordinated fashion using the PSRC document and the WSDOT System Planning effort.

Listed below are the major recommendations of this report:

1. SR 169 should be developed to a minimum of four lanes from the SR 516 intersection to 140th Way SE by year 2010.
2. Black Diamond is experiencing congestion and related problems within its city limits. Options for Black Diamond described within this report, plus any other options suggested by others, should be analyzed more fully when project specific design and environmental documentation are prepared.
3. Access to SR 169 will be managed based on RCW 47.50 and WACs 468-51 and 468-52, and RCW 47.52 where this law applies (see page 12).

4. Right of way width should be 150 feet except in those areas where there are shopping centers and high density residential uses adjacent to the highway. There the recommended width is 105 feet. New right of way may also be required if the section between 140th Way SE and 196th Avenue SE/Jones Road is increased to accommodate HOV lanes.
5. Where the right of way is not adequate per Recommendation 4 above, right of way should be purchased or protected in advance of need 1) to assure adequate area to eliminate roadway sections with sight-distance problems, and 2) to minimize the cost before development occurs.
6. Land should be acquired for a park and ride lot in the vicinity of 140th Way SE and SR 169 while it is still vacant.
7. As traffic volumes warrant, a partial grade separation may eventually be provided along SR 169 at 140th Way SE.
8. As the highway is expanded or rebuilt, shoulder widths are expected to increase to eight feet wide on each side of the highway. Inside city limits and where curb, gutter and sidewalk are constructed, a shy distance of five feet will be provided for bicycles. These accommodations will be sufficient for a Class IV Bike way along SR 169. King County is planning to build a bicycle/pedestrian trail between Renton and Morganville (near Black Diamond) utilizing old railroad right of way and other off-road properties.

ROUTE DEVELOPMENT PLAN

Introduction

A Route Development Plan is intended to identify the improvements needed for a designated section of State Highway to accommodate safety and capacity requirements at a future date, usually 20 years hence. This plan encompasses many factors synthesized into a recommended highway design. When approved, this long range plan will provide guidance for prioritization of the District's future projects, direction for the determination of impact mitigation measures for proposed developments and input into the statewide budgetary process.

This plan has been prepared in cooperation with local jurisdictions and agencies. Early in the planning process a scoping meeting was held with interested local officials and staff. Throughout the project, relevant plans of affected cities, the transit authority, the council -of governments and the county were reviewed for consistency. Any significant differences were discussed. Reports were then prepared with circulation to local agencies for review and comment. Final approval is issued by Headquarters in Olympia.

Background

This study of SR 169 is part of the Washington State Department of Transportation (WSDOT) District 1 Long Range Route Development Planning Program. This study encompasses section 1 of SR 169 from Enumclaw (SR 410) to 140th Way SE (Mile Post (MP) 0.00 to MP 22.96 - see Figures 1 and 2). SR 169 is known by three different names along its length. From south to north it is known as: 1) The Black Diamond-Enumclaw Road 2) The Maple Valley-Black Diamond Road and 3) The Renton-Maple Valley Road.

The section of SR 169 from SR 410 to SR 18 (MP 0.00 to MP 15.22) is classified as a Minor Arterial, with a Level of Development classification of Resurface, Restore and Rehabilitate (3-R). The section of SR 169 from SR 18 to I-405 (MP 15.22 to MP 5.26) is classified as a Principal Arterial. The Level of Development Plan indicates the development level of this portion of highway as Design Standards.

As of July 14, 1993, five projects were scheduled for this section of SR 169. With scheduled bid advertisement dates in parenthesis, these are:

- MP 4:20 to Green River Bridge, study slide area, MP 4.20 to MP 5.20 (no date);
- Green River Bridge, drainage improvements, MP 5.00 to MP 5.20 (3-94);
- Green River Bridge, deck rehabilitation, MP 5.20 to MP 5.33 (3-96);
- Black Diamond NCL to vicinity SE 288th Street, resurface, MP 9.18 to MP 9.75 (1 94); and
- SR 516 to 196th Avenue SE, widen to four lanes, MP 11.44 to MP 19.25 (10-96).

SR 169 traverses a wide variety of landscapes and uses. Between its terminals it passes through small towns, forests, river valleys, rural areas and emerging residential developments. Four King County planning areas (Newcastle, Soos Creek, Tahoma-Raven Heights and Enumclaw) abut or embrace the highway.

The 1985 King County Comprehensive Plan is designed to promote growth in or adjacent to existing residential areas, activity centers and rural towns. The stated intent is not to prevent growth but channel it where it can be accommodated with the least amount of new services and infrastructure. This approach will emphasize the importance of SR 169 in the future regional transportation system. Functionally, SR 169 operates as the principal arterial serving Maple Valley and is the only continuous north/south route between Renton and Enumclaw.

Existing zoning in the immediate vicinity of SR 169 is varied. While residential zones range from densities of one dwelling unit per 10 acres to 48 dwelling units per acre, the majority of residential zoning is for low densities (more than 15,000 square feet per unit). Small areas that are zoned for commercial activity primarily center about the intersections on SR 169 -at Kent-Kangley Road (SR 516, also known as "Four Corners"), Maple Valley, Wilderness Village and Black Diamond. Other zones include agricultural and natural resource areas located predominantly in the south half of the corridor. The county has recently completed a rezoning program that would more closely reflect the 1985 Comprehensive Plan for the Enumclaw area. The Tahoma-Raven Heights community zoning program has not been started yet.

In October of 1990 the Puget Sound Regional Council (PSRC) adopted Vision 2020, the combined Regional Transportation Plan and Regional Development Strategy. It is intended to fulfill the requirements of the Growth Management Act, ESHB 2929. As Vision 2020 is refined and local agencies meet the requirements of 2929, urban growth boundaries will be established and development form will become more clearly defined. As a result some changes in our projections could occur. Most likely, these changes will be towards more compact development and increase in mode split. This increase in mode split is not likely to alter the recommendations of this plan. The plan will be reviewed on a regular basis and revised as needed.

TYPICAL ROADWAY SECTION

The design standard for SR 169 is M-1 from MP 0.00 to MP 15.21, and P-1 from MP 15.22 to MP 22.96 with some discretion employed as to whether it is urban or rural. Today much of the area adjacent to SR 169 appears essentially rural. However, the portion south of Maple Valley in the vicinity of Black Diamond, and the area around the junction at Four Corners (SR 516/Kent-Kangley Road/SR 169 intersection) are taking on a suburban flavor. To anticipate and accommodate future development, and special cases, M-1 or M-5 standards will be utilized for the section classified as Minor Arterial and P-1 or P-6 standards for the section classified as Principal Arterial.

Number of Lanes

The existing lane configurations are as follows:

<u>From</u>	<u>To</u>	<u>Lanes</u>
SR 164 (MP 0.00)	Adams Ave. (MP 0.28)	3 lanes
Adams Ave. (MP 0.28)	Merritt Ave. (MP 0.61)	4 lanes
Merritt Ave. N. (MP 0.61)	196th Ave. SE (MP 19.77)	2 lanes
196th Ave. SE (MP 19.77)	SE 140th (MP 22.96)	5 lanes (by 1995)*

* Note: Section under construction 1993-1995. Currently this section is 2 lanes.

None of these lanes are designated for HOV use or as hill climbing lanes. The middle lane of the five lane section will be a two way left turn lane.

To determine the operational conditions on SR 169 and how many lanes would be needed to serve the users of SR 169 by 2010, an assessment was made of current and forecast traffic volumes. The method described by the Transportation Research Board's Highway Capacity Manual Special Report 209 was used to do this assessment. This method factors volume over capacity, resulting in a ratio that equates into six different levels of service.

Level of service (LOS) A is the highest level and is characterized by virtual free flow of traffic. The levels are scaled down so that "E" represents flows that approximate capacity. LOS F is where the number of vehicles on the roadway section exceeds capacity and flow is sporadic and occasionally completely stopped.

Table 1 on the next page indicates the average daily traffic (ADT) volumes for the last 12 years at selected locations¹. Historic growth rates were determined from these volumes. Included on this table are 1990 traffic estimates for locations on SR 169 from the final Environmental Impact Statement for the 1984 Tahoma-Raven Heights Community Plan for comparison purposes. The table shows that these estimates have already been exceeded. Volumes have increased significantly each year (6% to 10%) for two of the segments listed (between SR 516 and SE 214th Street, and north of 149th Street) on SR 169.

To increase the number of lanes from two to four lanes on state highways, the Design Hour Vehicles (DHV), which is the peak hour volume used to design future roadway capacity, must exceed 701 vehicles at some point in time. Table 2, also on the next page, indicates the existing and forecast traffic volumes for ADT and DHV, as well as the LOS for current and forecast conditions. The design hour volumes were calculated at a compounded rate of 3% per year. This figure was arrived at after reviewing the Puget Sound Regional Council's (PSRC) projections, the King County Transportation Plan and preparing a rough model of a "build out" scenario based on adjoining community plans. The projected growth rate appears conservative even if the "build out" is not achieved until after the design year.

¹ These ADT numbers are taken from the 1984, 1988 and 1992 Annual Traffic Report published by the Washington State Department of Transportation on an annual basis.

TABLE 1. SR 169 AVERAGE DAILY TRAFFIC (ADT)

LOCATION	MP	COUNT TYPE **	Average Daily Traffic (ADT)						AVERAGE GROWTH RATE	KC/EIS # 1990 EST
			1980	1983	1986	1987	1990	1992		
SE 432nd St. Jct, N Leg	0.67	Axle	5900*	6300*	6500*	7200*			2.9%	N/A
		Unit				7000*	6900	8000	2.80%	
SR 516 Jct. N Leg	11.46	Axle	6100	6600	8100	9200*			0.6%	6800
		Unit				8300*	11,100*	13,200	10.0%+	6800
S of SE 214 th Jct.	15.34	Axle	9600*	NA	10,900*	12,200*			03.0%	11,200
		Unit				11,600*	12,500*	13,500	3.10%	
196 th /Jones Rd Jct. N Leg	19.24	Axle		9800*	12,200	15,370*	16,300			7.00%
	NA	Unit				15,500	14,800	12,900	3.70%	
149 th St. Jct. N Leg	22.29	Axle	10,300*	14,200	16,900*	17,300			7.70%	NA
		Unit				16,400	23,000	22,800	6.70%	

NOTES

* - Indicates actual ground count.

** - Count type: Axles and units describe different methods of determining ADT based on ground counts. While not directly related, the historic growth rate can be determined from either. Current count practice is to describe volumes in terms of vehicle units.

- These volumes are from the 1984 Tahoma-Raven Heights Community Plan Final Environmental Impact Statement.

TABLE 2: SR 169 EXISTING AND 2010 DESIGN HOUR LOS

MP	ADT 1992	ADT 2010	K	DHV 1992	LOS EXISTING	DHV 2010	LOS 2 LANES	LOS 4 LANES
0.67	8000	13,225	10	800	C	1320	D	**
11.46	13,200	21,820	9	1190	D	1965	E	B/A (peak/non-peak direction)
15.34	13,500	22,315	9	1215	E	2010	F	B/A
19.24	12,900	21,325	8	1035	D	1705	E	B/A
22.29	22,800	37,690	8	1825	E	3015	F	D/B

NOTES

ADT - Stands for Average Daily Traffic, and is developed from traffic counts. This is the amount of traffic that would be expected on this segment on an average day of the year.

DHV - Stands for Design Hour Volume, is the peak hour volume used to design the future roadway capacity.

K - The percent of ADT that is DHV ($ADT \times K = DHV$). This factor comes from the most recent (1993) WSDOT Systems Plan.

** - Four lanes not recommended for this segment at this time.

As indicated by Table 2, most segments of this section of SR 169 will need additional capacity by 2010. The table also indicates that, when the additional capacity is built, the LOS will meet the current growth management service standards for this area.

Table 2 indicates that the southernmost segment of SR 169, from Enumclaw to SR 516, currently does not require an increase in capacity. It is therefore recommended that this segment be retained at two lanes, one in each direction. However, continuing growth in the south King County/north Pierce County area may require that this recommendation be reassessed in the future.

Between SR 516 and 196th Avenue SE/Jones Road, SR 169 is forecast to operate at LOS E/F by 2010 if capacity is not increased. This is below the LOS standards for this highway in this area. The recommended capacity increase is to expand the highway to four lanes. This is forecast to raise the LOS to B in the peak direction, which is acceptable.

At the time of this writing, the northernmost section, from 196th/Jones Road to SE 140th, is already under construction to five lanes. The five lane section will be two general purpose lanes in each direction, and a two way left turn lane for the majority of the segment. By 2010, it is anticipated that, as a five lane facility, the peak direction will be operating at LOS D. This area has also been developing at a fairly high rate because of its proximity to the Puget Sound employment areas. To ensure that the LOS does not drop below the growth management service standards, a reassessment of this segment of SR 169 will be needed periodically.

Right-of-Way Width

Currently the right-of-way width varies considerably along SR 169. From Enumclaw to SE 400th Street, it is predominantly 60 feet. From SE 400th Street to Maple Valley it ranges between 60 and 120 feet. As it passes through Black Diamond, the right-of-way width is 60 feet. When SR 169 is widened in the stretch between Wilderness Village and Maple Valley, additional right-of-way may be needed. North of Maple Valley, the right-of-way width averages about 110 feet. For much of the distance north of Maple Valley, the highway abuts the Burlington-Northern Railroad right-of-way of 100 feet. When the railroad right-of-way is formally abandoned, the proposal is to divide it between WSDOT and King County. The priority for division will be to satisfy the right-of-way requirements of SR 169 first. The right-of-way should be 150 feet wide when the roadway is fully developed, except through Black Diamond and developing shopping centers at important intersections. At these locations, Enumclaw, Four Corners (the junction with SR 516) and Wilderness Village (Witte Road - SE 231st Street area), a narrower right-of-way is justified because of the urban-like development. For locations that are developed for shopping and high density residential use, a 105 foot minimum right-of-way should be used to accommodate the desired cross section. (NOTE: The minimum design standard for minor arterials in an urban setting is 80 feet.)

Lane and Shoulder Widths

Existing lane widths vary considerably over the length of SR 169, ranging from 10 to 12 feet. These changes occur in random fashion more than 18 times. Shoulder widths also vary from 2 to 10 feet, changing frequently and without a consistent pattern. For the section that is rebuilt to four lanes, lane and shoulder widths will conform to the requirements of the Level of Development Plan. This means that lanes will be between 11 and 12 feet wide, and shoulders will be between 8 and 10 feet wide.

Curb. Gutter and Sidewalk

Much of SR 169 is proposed for a design speed of 60 mph. The WSDOT Design Manual indicates that curbs are not to be used on highways with a design speed exceeding 40 mph. While development will take place in the area adjacent to SR 169, the highway itself will probably retain a rural appearance. Thus, for the larger part of the route, curbs and sidewalks will not be needed. However, some areas may justify curbs and sidewalks because of more intensive development such as shopping centers. Specifically, these areas are: Between Kibler Avenue and Griffin Avenue in Enumclaw, from Old Lawson Road to James Street in Black Diamond, and at Four Corners and Wilderness Village Valley. There may be additional locations that require future delineation. Design speed will be established at a maximum of 40 mph in these areas.

LEVEL OF ACCESS CONTROL

Under the Revised Code of Washington (RCW) 47.50, SR 169 is an access controlled facility. The goal of this law is to establish levels of access management that will preserve the safety and operational characteristics of the highway. Based on the Washington Administrative Codes (WAC) 468-51 and 468-52, which implement the RCW, SR 169 has been assigned the following classes for access management in the study area:

<u>Milepost Limits</u>	<u>Section</u>	<u>Class</u>
0.00 - 2.67	SR 164 to SE 400th Street	4
2.67 - 6.75	SE 400th Street to Black Diamond	2
6.75 - 9.02	Black Diamond	4
9.02- 14.11	Black Diamond to SE 231st Street	3
14.11 - 14.23	SE 231st Street Connection	Controlled*
14.23 - 15.20	SE 231st Street to SR 18	3
15.20 - 15.22	SR 18	Controlled*
15.22- 19.24	SR 18 to 196th Avenue SE/Jones Road	2
19.24 - 23.23	196th Avenue SE/Jones Road to SE 150th Street	3

*- Controlled indicates that access to this section of highway has been purchased under RCW 47.52.

Access management classes are numbered from 1 to 5, with Class 1 the most restrictive, and Class 5 the least restrictive. In the case of Classes 1 and 2, if alternative access to non-state highway roadways is available, no access is allowed to the state highway. Also, both permitted private driveways and public intersections are to be located a minimum distance apart (determined by assigned class). Classes 3, 4, and 5 balance land use with access, and can allow two way left turn lanes under certain conditions. Classes 4 and 5 have the most closely spaced access allowed, and are generally for slower speed areas that are already developed to relatively permanent status. Non-conforming accesses are allowed under certain conditions as well.

It is important to restrain access to SR 169 as much as possible. Fortunately, because of existing development patterns, platting, and topography, the access points to SR 169 are relatively few and generally far apart. With a median barrier or a landscaped median, access can be controlled in a more effective manner. Access to the roadway could then be limited to left turns and through movements at intersections and right turns in general.

As of August 1993, the bids were opened for construction of a widening project between 140th Way SE and 196th Ave. SE. As part of this project, a Letter of Agreement was signed with King County to manage access. In the case of this project, a two way left turn lane will be built for the majority of the project limits, allowing full and unlimited access to all driveways and intersections along SR 169.

As the road is widened and improved further, access revisions will be recommended to eliminate or consolidate access points. During future design activities, the following access control measures will be addressed in coordination with the cities and county:

- ◆ Elimination of access where alternative access is available;
- ◆ Consolidation of access where adjacent parcels share access points;
- ◆ Construction of frontage or backage road access to consolidate access; and
- ◆ Access to state highways by new developments at a single point.

INTERCHANGES

Generally, interchanges are not planned for this route now. While SR 169 provides an important transportation facility for the area, no need for any interchanges are seen before year 2000. Access to SR 18 is now possible by using the interchange at SE 231st Street in Maple Valley. No interchange is planned at SR 18 directly.

A review of the intersection at SR 169 and 140th Way SE suggests that programmed improvements will not be able to handle the future volumes. Therefore, some type of grade separation may be needed to facilitate future traffic. This intersection needs to be reevaluated at a future time to determine if it would better serve the area as a partial grade separation.

INTERSECTIONS

Because SR 169 is the only continuous north-south arterial in the region, the limited number of intersections are heavily used. Thus it is important to facilitate traffic movement at these locations. An effective method to accomplish this is by providing exclusive turning lanes (channelization) at overloaded intersections. However, it is not the purpose of this plan to provide detailed geometric solutions for problems that may be 20 years off. That function will be included in the design reports of future projects.

Conceptual Channelization Plan

There are several intersections that have been channelized to various degrees along SR 169. They are:

<u>Mile Post</u>	<u>Location</u>	<u>Type of Channelization</u>
11.31	Private Road	LT far
11.44	Kent-Kangley Road (SR 516)	LT, RT near and far
12.38	SE 260th	RT near and far
13.86	Witte Road	LT near and far, RT far
14.04	Wax Road	RT near
14.17	SE 231 St.	LT near and far, RT far
14.24	Park and Ride Lot	LT near
15.07	SE 216th - 218th St.	LT far
17.68	Cedar Grove Road	LT far
19.22	Jones Rd. SE/196th Ave. SE	LT near and far
21.52	161st Ave. SE	LT near, RT far
22.29	149th Ave. SE	LT near and far
22.96	140th Way SE	LT near and RT far

If traffic forecasts based on build out conditions (assumed to be 2010) come to fruition as expected, there will be many more intersections that require channelization. The following streets that intersect SR 169 as arterials are not presently channelized, but are forecast to need channelization:

-Marshall Avenue (Enumclaw)	-Kibler Avenue (Enumclaw)
-McHugh Avenue (Enumclaw)	-SE 416th
-Enumclaw-Franklin Road	-SE 352nd
-SE Green River Gorge Road (Black Diamond)	-Ravensdale Road (Black Diamond)
-SE 240th Street	

Level of Service (LOS) calculations were obtained for several intersections. One intersection, SE 231st Street and SR 169, was checked for its 1987 LOS as part of this study. The Highway Capacity Manual software was used. For signalized intersections, "delay" is used as the criteria for determining level of service. At one end of the scale, LOS A is an average delay or wait of less than 5 seconds, while at the other end, LOS F is an average wait of more than 60 seconds. The analysis revealed that this intersection was operating satisfactorily in the afternoon peak hour in 1987. However, if volumes continue to grow, the existing geometrics will result in an intersection that is completely congested by 2010.

TABLE 3
LOS - SR 169/231ST ST. INTERSECTION (Signalized)
PM PEAK

		1987 VOLUMES	PROJECTED 2010	VOLUMES
DIRECTION	MOVEMENT	EXIST. GEOM.	EXIST. GEOM	IMPROVED*
SB	Through	C	C	C
	Worst (T)	C	C	C
NB	Through	A	A	A
	Worst (T)	A	F	C
EB	Through	C	C	D
	Worst (L)	D	F	D
WB	Through	D	E	C
	Worst (T)	D	E	D
Intersection	Average	B	F	C
	Worst	D	F	D

In addition to the above analysis, recent work on other intersections has been included to give a larger picture of present conditions on SR 169. The tables on the next two pages indicate that left turns from side streets at non-signalized intersections have a poor level of service. It can be further visualized that, when traffic volumes increase 75% to 90% on SR 169 in the next 20 years, many of these intersections will require substantial improvements. Further discussion of specific items appear later in this report.

TABLE 4
LEVEL OF SERVICE ANALYSIS - SELECTED INTERSECTIONS

* Would require the addition of several lanes.

A. Unsignalized Intersections - Existing Conditions

LOCATION - MOVEMENT	AM PEAK	PM PEAK
SR 169 @ 228th Ave. SE		
NB LEFT	C	D
RIGHT	A	A
WB LEFT	A	A
SR 169 @ Wax Road		
EB LEFT	E	E
THROUGH	D	E
RIGHT	A	A
WB LEFT	E	E
THROUGH	C	E
RIGHT	A	A
SB LEFT	B	A

B. Signalized Intersection - Existing Conditions

INTERSECTIONS	AM PEAK	PM PEAK
SR 169 @ Witte Road	C	B
SR169 @ SE 231st	C	D
SR 169 @ SR 516	B	B

Source: Wilsey & Ham Traffic Impact Analysis Report for Wilderness Village Apartment Complex - 1990

C. SR 169 and 196th Ave. SE Intersection - 1991 (PM Peak)

W/O SIGNAL	W/ SIGNAL
NB LT - LOS E SB - LOS E EB - LOS A WB - LOS B	ALL MOVEMENTS LOS B

Source: Dave Hamlin & Associates - Traffic Study for Shadow Ridge - 1988

Note: SR 169 at 196th Ave. SE/Jones Road was signalized and operational as of 12-13-91.

Need for Signalization

Intersections located on SR 169 that are currently signalized include: Kent-Kangley Road (SR 516), Witte Road, SE 231 St. Street, 196th Avenue SE/Jones Road, Cedar Grove Road and 140th Way SE.

Four intersections appear on the traffic priority list for signalization in District 1. They are listed below from south to north (also called milepost order). The first number under 'Rank' is the intersection's absolute ranking and the second number, 279, indicates the total number of intersections that have been assessed for rank. A request can be made for any intersection to be placed on the priority list for signalization. The rank of each intersection on the priority list is developed based on whether that intersection meets certain warrants, and how close it comes to meeting these warrants if one or more are not met. For WSDOT, the warrants that are considered of importance are Warrant 1 - major street

traffic volumes, Warrant 2 - minor leg intersection delay, and Warrant 6 - safety and accidents. The lower the rank number, the closer an intersection is to meeting warrants for signalization. The higher the rank number, the less likely that any warrants are met for this intersection. The locations include:

<u>Intersection</u>	<u>Rank</u>
SE 400th Street	115/279
SE Wax Road	39/279
152nd Avenue SE	159/279
149th Avenue SE	34/279 ²

Listing an intersection on the signalization priority list does not mean that the location will automatically be signalized. Rather it means that signalization, channelization, turning restrictions, etc., will be considered as possible solutions for the identified problems at these locations.

Within the time frame of this Route Development Plan other intersections on SR 169 could warrant signalization as well. Locations where signalization may be needed eventually are: SE 352nd (SE Green Valley Road), Kibler Avenue, 416th Avenue SE, Enumclaw-Franklin Road and SE Auburn-Black Diamond Road. In addition to these, it is likely that other locations will emerge as candidates for signalization.

² Data for this table is found in the August 20, 1993 listing of Signal Priority locations put out by WSDOT District 1. This listing is updated quarterly. Locations can change ranking, up or down, every time the Priority Listing is updated.

ROADWAY CHARACTERISTICS

Horizontal and Vertical Alignment Revisions

There are two stretches of roadway that require special attention. One is in Black Diamond where SR 169 has a right-of-way of 60 feet. This is inadequate if four lanes with left turn pockets are to be developed. The other is between SE 231st Street and the Cedar River crossing at Maple Valley (MP 15.06). At this location, SR 169 follows the side of a bluff between SR 18 and the railroad tracks at the base of the hill. This section will be very difficult to widen because of topography and associated costs. Thus a new alignment and right-of-way was looked at.

Widening SR 169 Through Black Diamond

To widen SR 169 through Black Diamond more R/W would be needed. This would involve taking some yards or homes in a three block stretch. Three general options were looked at to handle this question (see map in Figure 3):

1. Bypass Black Diamond

The first would be to bypass Black Diamond with a new route. Initial investigation results in the conclusion that an easterly bypass would not be effective because of topography and existing development. A bypass to the west of town would have more merit. Such an alternative was studied and recommended in the early seventies. This alternative would head northwesterly from SR 169 north of Jones Lake and follow the small valley immediately west of Black Diamond. It would swing northward to the present SR 169 roadway north of Roberts Drive. New right-of-way would be required for the entire length of the bypass. A portion of this roadway would pass through wetlands, while other portions are subject to development pressures.

One-way Couplet

A second alternative would be to develop a one-way couplet through Black Diamond. Present SR 169 would be utilized as the northbound roadway. Railroad Avenue, an abandoned right-of-way owned by Black Diamond, could provide the southbound leg a couple of blocks to the west. The grades along this western right-of-way would be moderate. In the northern sector the right-of-way is 100 feet wide, which would be adequate for the proposed roadway. The couplet would allow free movement on both legs and not present a wide street which a two-way road would. Another advantage would be to give the small but unique historic district exposure. This alternative would require little right-of-way acquisition because 60 feet would be sufficient each leg of the couplet. Cross section B illustrates the proposed geometrics for this option.

3. Widen SR 169 on Existing Alignment

The last option would be to widen SR 169 on its present alignment. However, the existing right-of-way is only 60 feet wide from Main Street north of James Street. This situation is also complicated by the fact that several homes have porches on or within five feet of the right-of-way. The situation developed prior to local zoning setback requirements. It is unlikely that these homes will be replaced in the near future since the zoning is single family on 7200 square foot lots making it economically difficult to justify replacement. This option would compound traffic problems and present a barrier through the middle of town.

Our recommendation is to analyze these and any other options suggested when project specific design and environmental documentation is prepared.

Maple Valley Area

The second concern is in Maple Valley between SE 225th Street projected (MP 14.40) and the Cedar River (MP 15.00). As mentioned before, the present roadway is on a narrow ledge with SR 18 above it to the west and railroad tracks below it to the east. Several alternatives were reviewed including displacement of the roadway some distance to either side. After analyzing these alternatives, the widening of the roadway at its present alignment appeared the most feasible. However, additional right-of-way on the east side would be required in some areas. The present owner of this property is King County Parks. Immediately east of the county property is the Burlington Northern Railroad right-of-way. This line is now abandoned which would allow for the displacement of the King County Trail if need be.

Cross sections taken indicate that the present road can be widened. Just how this should be done will be left for a design report. Cross Section D depicts this scenario.

Design Speed

Recent design reports (L-7606 and L-7228) list 60 mph as the design speed. Design report (L-7874) for the Green River Bridge indicated a design speed of 70 mph for that facility. The posted speed for this segment of highway varies between 35 and 50 mph. The recommended design speed is 60 mph. This figure is based on an estimation of what the environment will be like in 2010 and the function of this highway.

For the portion of SR 169 that traverses Black Diamond, a design speed of 40 mph is recommended. The desired development for this segment of SR 169 will include curbs and sidewalks to reflect the urban character of the town. A design speed of 40 is also recommended for areas that will develop into shopping or urban centers such as Wilderness Village and Four Corners and for the stretch in Enumclaw between Kibler and Griffin Avenues.

Accident History

(Note: An updated accident history for the two year the period between January 1991 through December 1992 has been completed. The data and associated conclusions are found in the attached Appendix A.)

From 1983 through 1986 there have been 869 accidents and 28 fatalities associated with SR 169. Five hundred sixty nine (569) people were injured. Table 5 compares the state accident rate with segments of SR 169 for 1986.

An updated summary of accident statistics (1987-1988) revealed an actual reduction in accidents, injures, and fatalities. Total accidents have dropped 4.2 % on an annual basis, injuries 2.4%, and fatalities 21.5%. The fatality percentage was not statistically significant due to the small numbers involved.

TABLE 5
ACCIDENT STATISTICS BY LOCATION

	ENUMCLAW TO BLACK DIAMOND <i>MP 0.00 to 9.09</i>	BLACK DIAMOND TO MAPLE VALLEY <i>MP 90.09 TO 16.02</i>	MAPLE VALLEY TO RENTON <i>MP 16.02 TO 25.18</i>	ALL STATE ROUTES
ACCIDENTS	37	75	142	37,092
ACCIDENT RATE ^{1/}	1.72	2.45	2.51	1.7
INJURY	25	64	100	22,502
INJURY RATE	1.16	1.92	1.77	1.1
FATALITIES	0	3	3	343
FATALITY RATE ^{2/}	0	8.99	5.31	1.6

Of the fatal accidents (22), four occurred at an intersection and two involved driveways. The stretch of road between MP 9.10 and MP 13.86 in the vicinity of Lake Wilderness had 11 fatalities in the four year period. This stretch of road is predominantly straight

^{1/} Occurrences per million miles of travel.

^{2/} Fatalities per hundred million miles of travel.

with mildly rolling terrain. A majority of the accidents occurred at non-intersection locations, not surprising since there are relatively few cross roads on this basically rural highway. Nevertheless, some intersections had a large number of accidents. Three intersections ranked high on the 1988 priority analysis of high accident locations in District 1. They were: SR 169/SR 516 (Kent-Kangley Road) Junction, ranked 87th; SR 169/Witte Road Junction, ranked 66th, and SR 169/Jones Road/196th Avenue SE Junction, ranked 51st. Table 6, on the next page, indicates the intersections with the highest number of accidents. It is expected that the accident picture would get better as improvements are made along SR 169.

Interestingly, the two intersections with the highest percentages of "entering at an angle" type of accidents were signalized in 1987. Since then, the frequency of accidents at Kent-Kangley Road and Witte Road has dropped considerably. Whereas the Kent-Kangley intersection was averaging 10 accidents a year, it dropped to 6.5 per year between July 1987 and June 1989. The Witte Road intersection accident rate dropped from 9 to 2.5 per year. Thus these two intersections were safer when signalized. The Jones Road/196th Avenue intersection which has had a high number of rear end accidents has also been signalized as of December 1991.

Sight-Distance Restrictions

State Route 169 meanders through the countryside for much of its 25 miles. Since it traverses many valleys, gullies, hills and hammocks, vertical and horizontal curves are a large part of its geometry. Research done in 1987 indicated that northbound, there were 11.34 miles with no passing permitted in 25 separate segments. Of these totals, 9.84 miles and 22 sections involving 37 horizontal or vertical curves were worthy of signing. Motorists headed southbound would find 25 segments within a span of 11.44 miles where passing was prohibited. For these restricted areas, there were 37 signs warning of curves in 21 of the sections.

TABLE 6
ACCIDENT TYPES BY INTERSECTION
1983 -1986

JUNCTION	MP	ACCIDENTS	INJURIES	FATALITIES	TYPE	OF	ACCIDENT
					MAJORITY	NO.	PERCENT
Kent-Kangley Road @	11.44	41	30	4	E.A.*	33	73%
Jones/196 th Ave. SE @	19.15	43	29	0	R.E.**	19	44%
Witte Road @	13.86	35	27	1	E.A.	24	69%
140 th Way SE #	22.96	28	15	0	R.E.	18	64%
Bain-Witte Roads	14.95	25	12	0	R.E.	14	56%
SE 231 st Street	14.14	19	15	0	R.E.	8	42%
SE 400 th Street	2.67	18	16	0	E.A.	9	50%

*- E. A. = Entering at Angle

** - R.E. = Rear End

@ - Signalized after 1987

- Signalized 3/26/79

In conjunction with the signs warning of curved roadway there are several places where the speed limit is reduced from a high of 50 mph. In Maple Valley, where the road curves and crosses under SR 18, the speed limit is 35 mph.

Because this is a planning report, sight-distance problems are not identified for all locations. The large majority of problem curves exist in the areas now developed with two lanes. When the roadway is enlarged to four or five lanes the design report will address areas with sight distance problems.

HOV TREATMENT

There are no HOV designated lanes on SR 169 now. The traffic forecast for SR 169 indicates that four lanes could handle the traffic at a reasonable level of service during the planning period. Therefore, at this time no HOV lanes are planned. It is recommended that the section north of 196th Avenue SE/Jones Road be reassessed for HOV additions if the LOS of the segment drops below D. Before the LOS drops, however, to facilitate bus - service, queue jumping measures could be employed at strategic intersections. These treatments should be analyzed in coordination with METRO when conditions warrant. If additional lanes are warranted for HOV purposes, additional right of way needs should be identified and reserved.

Due to expected congestion on the regional system downstream it is desirable to reduce vehicular trips as much as possible during the peak periods. It is necessary to develop park and ride lots to encourage transit, van and carpool use. Park and ride lots are located at Maple Valley, Enumclaw and west of Buckley on SR 410. No new park and ride lots have been planned along SR 169 since utilization of the existing lots is less than 50%. However, if use increases to 75% it will be necessary to expand or locate sites for additional lots.

One strategic location for a park and ride lot is in the vicinity of 140th Way SE and SR 169. Considerable vacant land exists in this area now, but development pressures will soon change this situation. Therefore, land should be acquired or preserved now to assure adequate space for a future lot. This site has potential as a joint development site.

BRIDGES AND STRUCTURES

There are six structures (bridges and underpasses) on SR 169 between Enumclaw (MP 00.00) and 140th Way SE (MP 22.96). They are as follows:

TABLE 7

SR 169 BRIDGE INFORMATION

MP	NO.	LOCATION	LENGTH	PROGRAM YEAR
1.51	169/	Newaukum Creek	33'	2063
5.20	169/8+. @	Green River	688'	2007
10.41	169/12	O/C of Burl. North. RR	153'	2014
15.00	169/18+, @	Cedar River (south of Maple Valley)	309'	2067
15.21	18/28+,@	U/C of SR 18	359'	----
16.00	169/20 @	Cedar River (one mile north of Maple Valley)	130'	2025

+ - means that the bridge is structurally deficient

@ - means that the bridge is functionally obsolete³

The structures over Newaukum Creek and the Cedar River south of Maple Valley have been replaced since this report was first drafted. They are both over 40 feet wide. The Cedar River bridge is the only one, however, built wide enough to accommodate four standard width lanes. The remaining bridges would be required to be replaced or widened, or parallel structures would need to be built when the highway is widened to four lanes.

³ The Department's bridge section uses a variety of tests to track bridge conditions and schedule repair and maintenance to preserve the structural integrity of the highway bridges. Frequently, a test will indicate that a bridge is structurally deficient for some reason, indicating a need for more maintenance or repairs, even though the bridge has many years of life remaining. Functionally obsolete bridges usually refer to those structures that are narrower than bridges built to current standards.

MISCELLANEOUS

Bicycle and Pedestrian Facilities

The Master Plan of Statewide Bicycle Corridors (WSDOT) designates all of SR 169 as an approved corridor. The proposed shoulders (8 foot) and 5 foot shy distances in sidewalk areas on SR 169 meet standards for a Class IV Bikeway. At the present time bicycle use is probably minimal for commuting because of the nature of the road and the long commuting distances.

The Bicycling in King County map (King County, revised 1988) indicates that a future off road bicycle/pedestrian trail between Renton and Morganville (which is located slightly north and west of Black Diamond) is planned for construction by King County. This trail is off the highway right of way and uses portions of the abandoned railroad right of way on the north and east sides of SR 169. Between 196th Ave. SE/Jones Road and 140th Way SE, SR 169 is currently under construction and the contract plans include construction of parts of this trail. This trail will be in close proximity to SR 169 for about 60% of its length.

There are limited sidewalks established along SR 169. Most of these exist in residential areas of Enumclaw and Black Diamond. Sidewalks will not be needed for most of SR 169 by 2010 because much of the adjacent property will be developed into low density residential and rural uses in the next 20 years. Some pedestrian facilities will be justified near shopping centers and higher density developments such as Four Corners and Wilderness Village. For these areas sidewalks and other pedestrian facilities can be developed for delineation and safety reasons. Where design speeds exceed 40 mph and sidewalks are planned, design speeds should be lower to meet Design Manual Standards.

Bus Pullouts

At the present time Metro runs scheduled buses on SR 169 to Enumclaw. During peak hours, standard sized buses are used and for off-peak daytime hours vans are employed. In the future, Metro expects to provide regular service throughout the day. There have been some bus stops established in the past few years. More locations will be developed to accommodate future development as the need arises. These should be developed to WSDOT design standards. School buses use portions of SR 169 on a regular basis.

Land Developer Participation

Anyone developing land that impacts a state highway is expected to mitigate any impacts that they would impose on that highway. If a development generates ten or more peak hour trips a day, a traffic study is required. Access permits are required from the state for any direct approach to a state highway. As the only continuous highway between Renton and Enumclaw, the capacity of the road should be protected. This can be done by minimizing access, utilizing channelization where appropriate and installing signals if warranted. Where right-of-way widths are less than desired, additional area should be obtained. Specific mitigation measures should be identified after a review and analysis of a given situation using the procedure defined by WSDOT policy.